

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
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1. REPORT DATE (DD-MM-YYYY) 01-10-1991		2. REPORT TYPE		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE DATA FUSION LEXICON				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) WHITE, FRANKLIN E.				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) DATA FUSION PANEL JOINT DIRECTORS OF LABORATORIES TECHNICAL PANEL FOR C3				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Unclassified/Unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT Standardized terminology for common communications in the field of data fusion					
15. SUBJECT TERMS Data fusion; command control communications					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
Unclassified/Unlimited					Barbara Busch, SSC-Pacific Library
a. REPORT	b. ABSTRACT	c. THIS PAGE	U	15	19b. TELEPHONE NUMBER (include area code)
U	U	U			(619)553-4890

144275



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OCTOBER 1991

NCCOSC RDTE DIV (NRaD)
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Published by:

The DATA FUSION SUBPANEL
of the
Joint Directors of Laboratories,
Technical Panel for C3

144275



1991 Data Fusion Lexicon

Since language and usage often underlie communication problems, the purpose of this lexicon is to provide some common terminology for theoreticians, developers and users involved in the field of data fusion. This will help facilitate the exchange of information and cooperation within the data fusion community through the enhancement of communications and understanding.

The sources for the definitions in this lexicon are Joint Pub 1-02 (JCS), the Intelligence Community Staff's Glossary of Intelligence Terms and Definitions (DCI), the Defense Intelligence College's Glossary of Intelligence Terms (DIC) and the Data Fusion community through feedback to the Subpanel members. Definitions taken from Joint Pub 1-02 and the two glossaries are identified, using the above abbreviations, in bold print at the end of the definition. Since the AI community has also developed a "language" with terms important to the Data Fusion community, those terms are identified in this version of the lexicon by "(AI)" following the definition.

The Data Fusion Lexicon is a living document that is reviewed and updated on a regular basis. Your recommendations for additions, deletions, or modifications to the definitions contained herein will be gratefully appreciated. Please forward your comments to:

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Abstraction -

The act or process of producing an information product from the actual observed physical object(s) or concept.

Acoustical Intelligence (ACINT) -

(1) Intelligence information derived from analysis of acoustic waves radiated either intentionally, or unintentionally, by the target into the surrounding medium. (2) In Naval usage, the acronym *ACINT* usually refers to intelligence derived specifically from analysis of underwater acoustic waves from ships and submarines. (3) The technical and intelligence information derived from foreign sources that generate waves. [DCI]

Acquisition -

(see *Target Acquisition*)

Actionable Intelligence -

Intelligence information that is directly useful to customers without having to go through the full intelligence production process; it may address strategic or tactical needs, close-support of U.S. negotiating teams, or action elements dealing with such matters as international terrorism or narcotics.

Adaptive Learning -

Operational or behavioral adjustments to sensed situations which are derived from experiential or common-sense knowledge.

Aggregation -

The collection and identification of information into (or with respect to) higher level information groups.

Alert -

(1) Readiness for action, defense or protection. (2) A warning signal of a real or threatened danger, such as an air attack. (3) The period of time during which troops stand by in response to an alarm. (4) To forewarn; to prepare for action. (5) A warning received by a unit or headquarters which forewarns of an impending operational mission. [JCS] (6) A visual or audible warning provided at a console indicating to the operator that a situation requiring his immediate attention.

Algorithm - a mathematical rule or procedure for solving a problem.

Bayesian Data Association Algorithm -

An association algorithm which introduces explicit prior densities for the track states and association hypotheses and computes the

posterior probabilities for tracks and hypotheses by means of Bayes' rule. Such an algorithm usually maintains multiple alternative association hypotheses, with their scores, and updates them recursively.

Extended Kalman Filter -

An algorithm which applies the Kalman filter update equations to nonlinear measurements by linearizing the measurement function about the most recent state estimate.

Alignment -

Processing of raw sensor data to achieve a common time base, a common spatial reference, common units, etc., as necessary to properly normalize the data for subsequent processing.

All Source -

All source refers to a processing system that uses intelligence or information received from all available sources. These sources may include all of the intelligence typed (e.g., SIGINT, IMINT, RADINT, HUMINT, etc.) and multiple collection assets within a given environment.

Ambiguity Resolution -

A decision procedure for eliminating a discrete alternative from consideration, after sufficient data has been obtained showing it to be untenable (e.g., resolution of left/right ambiguity of bearing data from a beamformed line array of sensors). The phrase is sometimes also used to indicate decisions made between competing association hypotheses.

Analysis -

A process in the production step of the intelligence cycle in which intelligence information is subjected to systematic examination in order to identify significant facts and derive conclusions therefrom. (Also see *intelligence cycle*.) [DCI]

Angle of Arrival (AOA) -

A measure of the direction or propagation of electromagnetic radiation upon arrival at a receiver.

Anti-Jamming -

A synonym for electronic counter-countermeasures.

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Area of Influence -

A geographical area wherein a commander is directly capable of influencing operations, by maneuver or fire support systems normally under his command or control. [JCS]

Areas of Interest - (AOI)

That area of concern to the commander, including the area of influence, areas adjacent thereto, and extending into enemy territory to the objectives of current or planned operations. This area also includes area occupied by enemy forces who could jeopardize the accomplishment of the mission. [JCS]

Area of Probability - (AOP)

A specified area in which a track/target will most likely be located.

Assessment -

(1) Analysis of the security, effectiveness and potential of an existing or planned intelligence activity. (2) Judgment of the motives, qualifications and characteristics of present or prospective employees or agents. [JCS]

Assignment -

The selection of a solution paradigm to achieve the optimization defined in the correlation step, resulting in the assignment of sensor data to entities.

Association -

The definition and calculation of a closeness metric on which the assignment of sensor data items to entities will be decided.

Data Association -

The process of generating, scoring, and deciding on hypotheses about the questions of which detections/measurements under consideration refer to the same object (come from the same target and should be associated) and which refer to different objects.

Global Association Hypothesis -

A partition of the set of detections received so far, where no two subsets contain detections from the same target and no subset contains detections from more than one target.

Parameter Association -

Association or reports or tracks based on an acceptable level of similarity or closeness in corresponding parameter estimates.

Attribute -

An identity or class-revealing characteristic of an object as either measured by a sensor or derived from the sensor data.

Attribute Fusion -

Processes which operate on attributes or features to produce a metric from which an entity's identity or class can be estimated. (These processes are typically of a statistical nature.)

Authentication -

(1) A security measure designed to protect a communications system against fraudulent transmission or simulation by establishing the validity of a transmission, message or originator. (2) A means of identifying individuals and verifying their eligibility to receive specific categories of information. (3) Evidence by proper signature or seal that a document is genuine and official. [JCS]

Back-chaining -

A control procedure that attempts to achieve goals recursively, first by enumerating antecedents that would be sufficient for goal attainment and second by attempting to achieve or establish the antecedents themselves as goals.

Backtracking -

A search procedure that makes guesses at various points during problem-solving and returning to a previous point to make another choice when guess lead to an unacceptable result.

Basic Intelligence -

Fundamental intelligence concerning the general situation, resources, capabilities and vulnerabilities of foreign countries or areas which may be used as reference material in the planning of operations at any level and in evaluating subsequent information relating to the same subject. [JCS]

Bayesian Statistics-

Statistical work based on use of Bayes' rule and the introduction of explicit prior densities.

Bearing Line -

A line indicating the azimuthal direction of an entity.

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Belief -

A hypothesis or proposition about some situation. In the theory of Dempster and Shafer, beliefs are organized into a "frame of discernment" which enumerates all possible beliefs about some event of interest. Each is assigned a number which reflects the amount of evidence available which supports that belief. If a Bayesian prior density is available, the measure of belief assigned to a proposition will be equal to its probability.

Blackboard -

A globally accessible data exchange medium for recording intermediate, partial results of problem-solving. Typically, the blackboard is partitioned for representing hypotheses at different levels of abstraction and mediates the cooperative activities of multiple "subexperts" or specialists.

Capability -

The ability to execute a specified course of action. [JCS]

Certainty -

A measure of the confidence placed by a user or expert system in the validity of a proposition, hypothesis, or inferential rule.

Circular Error Probability (CEP) -

An indicator of the delivery accuracy of a weapon system, used as a factor in determining probable damage to a target. It is the radius of a circle within which half of a missile's projectiles are expected to fall. [JCS]

Classification -

(1) (Security) The determination that official information requires, in the interest of national security, a specific degree of protection against unauthorized disclosure, coupled with a designation signifying that such a determination has been made. [JCS] (2) (Objects) A determination by any means whereby the identity, class, or category of an entity (person, object, or target) is provided (e.g., naval class, country of origin, aircraft type, etc.).

Classifier -

1. A computational process which determines the classification of an object.

2. A type of measurement from which the classification of the object can be directly inferred.

Clutter -

Permanent echoes, cloud or other atmospheric echo on radar scope; as contact has entered scope clutter. [JCS]

Collateral -

All national security information classified under the provisions of an Executive Order for which special Intelligence Community systems or compartmentation (i.e., sensitive compartmented information) are not formally established. [DCI]

Collation -

A step in the processing phase of the intelligence cycle in which the grouping together of related items of information provide a record of events and facilitate further processing. [JCS]

Collection -

(also see *Intelligence Cycle*)

The exploitation of sources by collection agencies and the delivery of the information obtained to the appropriate processing unit for use in the production of intelligence. [JCS]

Collection Assets -

Personnel, equipment, and electronic systems which provide surveillance or reconnaissance information on the enemy, as well as other friendly troop and equipment resources who may be tasked to perform certain limited reconnaissance and surveillance functions while performing other tasks.

Collection Management -

The process of converting fusion processing requirements into sensor collection requirements.

Combat Information -

Unevaluated data, gathered by or provided directly to the tactical commander which, due to its highly perishable nature or the criticality of the situation, cannot be processed into tactical intelligence in time to satisfy the user's tactical intelligence requirements. [JCS]

Combat Intelligence -

That knowledge of the enemy, weather, and geographical features required by a commander in the planning and conduct of tactical operations. [JCS]

Combination -

The act or process of associating data for a common purpose.

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Combination Approaches -

Techniques employed to effect the combination of parameters or states which result in improved specificity - some techniques are:

- Parametric Bayesian
- Evidential (Dempster-Shafer)
- Non-parametric Classification (Clustering)

Combinatorics -

That branch of mathematics relating to the arrangement and manipulation of mathematical elements in sets.

Command -

(1) The authority that a commander in the military Service exercises over subordinates by virtue of rank or assignment. Command includes the authority and responsibility for effectively using available resources and for planning the employment of, organizing, directing, coordinating, and controlling military forces for the accomplishment of assigned missions. (2) An order given by a commander; that is, the will of the commander expressed for the purpose of bringing about a particular action. (3) A unit or units, an organization, or an area under the command of one individual. (4) To dominate by a field of weapon fire or by observation from a superior position. [JCS]

Command and Control (C2) -

The exercise of authority and direction by a properly designated commander over assigned forces in the accomplishment of his mission. Command and control is supported through an arrangement of personnel, equipment, communications, facilities, and procedures which are employed by a commander in planning, directing, and coordinating and controlling forces and operations in the accomplishment of his mission. The basic functions of command and control are decision-making and force/resources management.

Communications Intelligence (COMINT) -

Technical and intelligence information derived from intercept of foreign communications by other than the intended recipients; it does not include the monitoring of foreign public media or the intercept of communications obtained during the course of counterintelligence investigations within the United States. [DCI]

Compartmentation -

Formal systems of restricted access to intelligence activities, such systems established by and/or managed under the cognizance or the Director of Central Intelligence to protect the sensitive aspects of sources, methods, and analytical procedures of foreign intelligence programs. [DCI]

Composite Track File -

That track file resulting from the application of a tracking process to all appropriate sensor data or to sensor-specific tracks.

Contact -

1. A set of detections/measurements believed to be associated with a single target.
2. An object detected by one's sensors.

Control -

(1) Authority which may be less than full command exercised by a commander over part of the activities of subordinate or other organizations. (2) In mapping, charting, and photogrammetry, a collective term for a system of marks or objects on the earth or on a map or a photograph, whose positions or elevations, or both, have been or will be determined. (3) Physical or psychological pressures exerted with the intent to assure that an agent or group will respond as directed. (4) An indicator governing the distribution and use of documents, information, or material. Such indicators are the subject of intelligence community agreement and are specifically defined in appropriate regulations. [JCS]

Correlation -

The structural, functional or qualitative correspondence between comparable entities; a decision-making process which employs an association metric as a basis for allocating or assigning sensor measurements and/or reports to the hypothesized entities of interest (see also **Association, Assignment**).

Correlator/Tracker -

Algorithms or systems which perform the process of correlation and tracking (see definitions). These processes are typically derived from modern estimation theory and operate on kinematic data or estimates to produce a statistically-optimal, fused estimate of an object's position.

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Countermeasures -

(also see *Electronic Warfare*.)

That form of military science that by the employment of devices and/or techniques has as its objective the impairment of the operational effectiveness of enemy activity.

[JCS]

Course of Action -

1. Any sequence of activities which an individual or a unit may follow.

2. A possible plan open to an individual or commander which would accomplish or is related to the accomplishment of his mission.

3. The scheme adopted to accomplish a job or mission.

4. A line of conduct in an engagement.

Critical Node -

An element, position, or communications entity whose disruption or destruction immediately degrades the ability of a force to command, control, or effectively conduct combat operations. [JCS]

Cryptanalysis -

The steps or processes involved in converting encrypted messages into plain text without initial knowledge of the algorithm or key employed in the encryption. [DCI]

Cueing -

A collection asset management technique whereby coarse grain (detection, general location and possible recognition) information obtained from wide area surveillance systems is used to concentrate the efforts of secondary sensor systems with more detailed information gathering capability to obtain fine grain (location, recognition, and possibly identification) information in order to identify the composition of enemy units for decision-making purpose and to acquire targets.

Damage Assessment -

(1) (*Intelligence usage*) An evaluation of the impact of a compromise in terms of loss of intelligence information, sources, or methods, and which may describe and/or recommend measures to minimize damage and prevent future compromises. (2) (*Military usage*.) An appraisal of the effects of an attack on one or more elements of a nation's strength (military, economic, and political) to determine residual capability for further military action in support

of planning for recovery and reconstitution.

[DCI]

Data Fusion -

A process dealing with the association, correlation, and combination of data and information from single and multiple sources to achieve refined position and identity estimates, and complete and timely assessments of situations and threats as well as their significance.

Data Fusion Functional Levels -

1. Level 1 products are those which specify position, identity, and amplifying kinematic and classification characteristics such as features.

2. Level 2 products are those which specify relationships among entities such as tactical intent and estimate lethality. Level 2 processes generally perform contextual analyses of the Level 1 products by employing numerous a priori databases; Level 2 fusion results in a Situation Assessment which includes various behavioral characteristics of the hostile force (events and activities analyses).

3. Level 3 products provide a Threat Assessment by estimating hostile force lethality and intent and other higher level intelligence functions.

Deception -

Those measures designed to mislead the enemy by manipulation, distortion or falsification of evidence to induce him to react in a manner prejudicial to his interests. [DCI]

Communications Deception -

The deliberate transmission, retransmission, alteration, absorption, or reflection of telecommunications in a manner intended to cause a misleading interpretation of these telecommunications. It includes:

(a) imitative communications deception-- Intrusion into foreign communications channels for the purpose of deception by introducing signals or traffic in imitation of the foreign communications.

(b) manipulative communications deception-- The alteration or simulation of friendly telecommunications for the purpose of deception. [DCI]

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Electronic Deception -

The deliberate radiation, reradiation, alteration, absorption, or reflection of electromagnetic radiations in a manner intended to mislead an enemy in the interpretation of or use of information received by his electronic systems. There are two categories of electronic deception: (1) *Manipulative* deception - The alteration or simulation of friendly electromagnetic radiations to accomplish deception, (2) *Imitative* deception - The introduction of radiations into enemy channels which imitate his own emissions. [JCS]

Decision Aid(s) -

Tools to enhance human decision-making performance by identifying key factors, structuring the decision process, estimating values, evaluating alternatives, predicting outcomes, effectively presenting information, or effectively managing information. (AI)

Decision Rules -

In general, a class assignment rule. In classical decision theory, a class assignment or the maximum a priori probability. (AI)

Decision Space -

The set of all possible decision states. (AI)

Decision State -

A snapshot of the condition of a decision system at a given point in time. (AI)

Declaration -

In data fusion processing, this term generally means the setting forth of a decision on entity identity or class (i.e., a classification decision), along with appropriate measures of the uncertainty of that decision; thus, in statistically-based classification processes a declaration is a statement of the probable existence of a given entity along with a vector of probabilities reflecting the uncertainties across all possible entity classes.

Detection -

(1) In tactical operations, the perception of an object of possible military interest but unconfirmed by recognition. (2) In surveillance, the determination and transmission by a surveillance system that an event has occurred. (3) In arms control, the first step in the process of ascertaining the occurrence of a violation of an arms-control agreement. [JCS]

Direction Finding -

A procedure for obtaining bearings of radio-frequency emitters with the use of a highly directional antenna and a display unit on an intercept receiver or ancillary equipment. Direction finding is a component of communications intelligence. [DCI]

Dissemination -

The timely distribution of intelligence products (in oral, written, or graphic form) to departmental and agency intelligence consumers in a suitable form. [DCI]

Dissimilar Source Integration (DSI) -

The integration of data from various classes of sensors (radar to ELINT to acoustic).

Doctrine -

(1) Fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative but requires judgment in application. [JCS] (2) Procedural basis for implementing threat evaluation weapon assignment, IFF-identification and track management functions.

Electronic Counter-Countermeasures

That division of electronic warfare involving actions taken to insure friendly effective use of the electromagnetic spectrum despite the enemy's use of electronic warfare. [JCS]

Electronic Countermeasures -

That division of EW involving actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum. Electronic countermeasures include electronic jamming and electronic deception. [JCS]

Electronic Intelligence - (ELINT)

(1) Technical and intelligence information derived from foreign electromagnetic noncommunications transmissions by other than the intended recipients. (2) Technical and intelligence information derived from foreign noncommunications electromagnetic radiations emanating from other than atomic detonation or radioactive sources. [DCI]

Electronic Order of Battle - (EOB)

A listing of noncommunications electronic devices including site designation, nomenclature, location, site function, and any other pertinent information obtained from any source and which has military significance when related to the devices. [DIC]

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Electronic Warfare - (EW)

Military action involving the use of electromagnetic energy to determine, exploit, reduce or prevent hostile use of the electromagnetic spectrum and action which retains friendly use of the electromagnetic spectrum. Electronic Warfare consists of electronic warfare support measures, electronic countermeasures and electronic counter-countermeasures. [JCS]

Emission Control (EMCON) -

The selective and controlled use of electromagnetic, acoustic, or other emitters to optimize command and control capabilities while minimizing, for operations security (OPSEC), detection by enemy sensors; to minimize mutual interference among friendly systems; and/or to execute a military deception plan. [JCS]

Emitter -

That class of enemy entities detected or classified initially by attributes related to observables depending on emission of electromagnetic radiation by the entity.

Encrypt -

To convert plain text into unintelligible form by means of a cryptosystem. (Note: The term encrypt covers the meanings of encipher and encode.) [JCS]

Entity -

Any object or object set (or event or event set) which forms the basis of a hypothesis used in data fusion processes.

Essential Elements of Information (EEI) -

The critical items of information regarding the enemy and the environment needed by the commander by a particular time to relate with other available information and intelligence in order to assist in reaching a logical decision. [JCS]

Evaluation -

Appraisal of the worth of an intelligence activity, information, or product in terms of its contribution to a specific goal; or the credibility, reliability, pertinency, accuracy, or usefulness of information in terms of an intelligence need. Evaluation may be used without reference to cost or risk, particularly when contrasted with assessment (Also see *assessment*); it is also a process in the

production step of the intelligence cycle. [DCI]

Event Recognition -

The ability to declare that a specific event is occurring or has occurred based on analysis of a series of activities and known factors such as foe, doctrine, etc.

Expert System(s) -

1. A computer system that achieves high levels of performance in task areas that, for human beings, require years of special education and training.

2. A computer program that embodies the expertise of one or more experts in some limited domain and applies this knowledge to make useful inferences for the user of the system.

3. A computer system employing human knowledge to solve problems that ordinarily require human intelligence. Such systems stimulate expert human performance and present a human-like facade to the user. (AI)

Exploitation -

The process of obtaining intelligence information from any source and taking advantage of it for intelligence purposes.

Feature -

(1) In cartography, any object or configuration of ground or water represented on the face of the map or chart. [JCS] (2) Generically, any identity or class-revealing characteristic of an entity as either measured by a sensor or derived from sensor data.

Foreign Instrumentation Signals

Electromagnetic emissions associated with the testing and operational deployment of non-U.S. aerospace, surface, and subsurface systems which may have either military or civilian application; it includes but is not limited to the signals from telemetry, beaconry, electronic interrogators, tracking/fusing/arming/command systems, and video data links. [DCI]

Foreign Instrumentation Signals Intelligence (FISINT) -

Technical and intelligence information derived from intercept of foreign instrumentation signals (see above). [DCI]

Forward Line of Own Troops -

A line which indicates the most forward positions of friendly forces in any kind of military operation at a specific time. The

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forward line of own troops normally identifies the forward location of covering and screening forces. [JCS]

Fusion - (see Data Fusion)

Gridlock -

Automatic alignment of units within a grid system, requiring a reference unit from which each system computer calculates corrections/compensations based on all mutually held tracks/targets.

Heuristics -

1. Informal techniques that aid in the discovery of solutions to problems.

2. A "rule of thumb" used in problem solving.

Human Intelligence - (HUMINT)

A category of intelligence derived from information collected and provided by human sources. [JCS]

Identification (ID) -

(1) The process of determining the friendly or hostile character of an unknown detected contact. (2) In arms control, the process of determining which nation is responsible for the detected violations of any arms control measure. (3) In combat operations, discrimination between recognizable objects as being friendly or enemy, or the name that belongs to the object as a member of a class (e.g. IFF, NCTI, NCTR). [JCS]

Imagery Intelligence (IMINT) -

(1) The collected products of imagery interpretation processed for intelligence use. [DIC] (2) Intelligence information derived from the exploitation of collection by visual photography, infrared sensors, lasers, electro-optics and radar sensors such as synthetic aperture radar wherein images of objects are reproduced optically or electronically on film, electronic display devices or other media. [JCS]

Indications and Warning (I&W) -

Those intelligence activities intended to detect and report time-sensitive intelligence information on foreign developments that could involve a threat to U.S. or allied military, political, or economic interests, or to U.S. citizens abroad. It encompasses forewarning of: enemy hostile actions or intentions; the imminence of hostilities; serious insurgency; nuclear/non-nuclear attack on the U.S., its

overseas forces, or allied nations; terrorist attacks; and other similar events. [JCS]

Inference -

Rule-based Inference Techniques -

Computer programs which explicitly employ rules or rule set components.

Inference Engine -

The control element (or module) of an expert system software architecture which controls the addition and deletion of beliefs or inferences to the system database. (AI)

Initiation -

In tracking, the process of establishing a new track in the system.

Instantiation -

To represent an abstraction (e.g., situational template data structure) by a concrete instance.

Integration -

(1) A stage in the intelligence cycle in which a pattern is formed through the selection and combination of evaluated information. [JCS]

(2) The process of combining information from various sources to arrive at a more complete understanding of the tactical situation.

Intelligence: -

(1) A body of evidence and the conclusions drawn therefrom which is acquired and furnished in response to the known or perceived requirements of customers; it is often derived from information which is concealed or not intended to be available for use by the acquirer; it is the product of a cyclical process. (Also see **Intelligence Cycle**.) (2) A term used to refer collectively to the functions, activities, or organizations which are involved in the process of planning, gathering, and analyzing information of potential value to decision makers and to the production of intelligence as defined above. (3) The product resulting from the collection, collation, evaluation, analysis, integration, and interpretation of all collected information. [DCI]

Intelligence Analysis-

A larger view process encompassing Situation Abstraction, Situation Assessment and Threat Assessment for intelligence purposes.

Intelligence Cycle -

The processes by which information is acquired and converted into intelligence and

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made available to customers. There are usually five steps in the cycle:

a. *Planning and Direction* --determination of intelligence requirements, preparation of a collection plan, issuance of orders and requests to information collection entities, and a continuous check on the productivity of collection entities.

b. *Collection* --acquisition of information or intelligence information and the provision of this to processing and/or production elements.

c. *Processing* --conversion of collected information and/or intelligence information into a form more suitable for the production of intelligence.

d. *Production* --conversion of information or intelligence information into finished intelligence through the integration, analysis, evaluation, and/or interpretation of all available data and the preparation of intelligence products in support of known or anticipated customer requirements.

e. *Dissemination* --conveyance of intelligence in suitable form to customers. [DCI]

Intelligence Estimates -

An appraisal, expressed in writing or orally, of available intelligence relating to a specific situation or condition with a view to determining the courses of action open to the enemy or potential enemy and the order of probability of their adoption. [JCS]

Intelligence Requirements -

Any subject, general or specific, upon which there is a need for the collection of information, or the production of intelligence. See also Essential Elements of Information. [JCS]

Intention -

An aim or design (as distinct from capability) to execute a specified course of action. [JCS]

Intercept -

Acquisition of electromagnetic signals (such as radio communications) by electronic collection equipment without the consent of the signallers for intelligence purposes. [DCI]

Interoperability -

(1) The ability of systems, units or forces to provide services to and accept services from other systems, units or forces and to use the services so exchanged to enable them to operate effectively together. (2) The condition achieved

among communications-electronics systems or items of communications-electronics equipment when information or services can be exchanged directly and satisfactorily between them and/or their users. The degree of interoperability should be defined when referring to specific cases. [JCS]

Jamming -

Barrage Jamming - Simultaneous electronic jamming over a broad band of frequencies.

Electronic Jamming - The deliberate radiation, reradiation, or reflection of electromagnetic energy for the purpose of disrupting an entity's use of electronic devices, equipment or systems. [DCI]

Spot Jamming - The jamming of a specific channel or frequency. [JCS]

Sweep Jamming -

Jamming in which a noise-like signal is moved rapidly and irregularly throughout a frequency band. [JCS]

Kalman Filter -

A recursive filter that computes the least mean square estimate of an object's state from linear measurements.

Knowledge -

Facts, beliefs, and heuristic rules. (AI)

Knowledge Engineering -

A subfield of AI concerned with identifying, extracting, and recoding human knowledge into a computer-readable form to solve problems that ordinarily require human intelligence. (AI)

Knowledge Acquisition -

The extraction and formulation of knowledge derived from extant sources, especially from experts. (AI)

Knowledge Base -

The repository of knowledge in a computer system. (AI)

Knowledge Source -

Generally, a body of domain knowledge relevant to a specific problem. In particular, a codification made applicable for an expert system. (AI)

Location -

The determination of the position of an object or activity with sufficient accuracy to permit its exploitation within the framework of area under surveillance.

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Manipulative Deception -

The alteration or simulation of friendly electromagnetic radiations to accomplish deception. [DCI]

Maximum Likelihood Estimator (MLE)-

The value that maximizes the probability of the observed sample.

Meaconing -

A system of receiving radio beacon signals and rebroadcasting them on the same frequency to confuse navigation. The Meaconing stations cause inaccurate bearings to be obtained by aircraft or ground stations. [JCS]

Measurement and Signature Intelligence (MASINT) -

Scientific and technical intelligence information obtained by quantitative and qualitative analysis of data (metric, angle, spatial, wavelength, time dependence, modulation, plasma, and hydromagnetic) derived from specific technical sensors for the purpose of identifying any distinctive features associated with the source, emitter, or sender to facilitate subsequent identification and/or measurement of the same. [JCS]

Metarule -

A rule that prescribes the manner in which rules should be employed. (AI)

Multilevel Secure -

A class of system containing information with different sensitivities that simultaneously permits access by users with different security clearances and needs-to-know, but prevents users from obtaining access to information for which they lack authorization.

Multi-Source Correlation -

Correlation of tracks from multiple force organic platforms.

Non-Organic Data -

Data from sources outside the organic area of coverage or sensors outside a particular platform that are usually processed on a non-realtime basis.

Nuclear Intelligence (NUCINT) -

Intelligence derived from the collection and analysis of radiation and other effects resulting from radioactive sources. [JCS]

Observables -

Those state variables of an object which can be estimated from the sensor data, or those

attributes of an object which can be deduced from the measurements made on it.

Order of Battle (OB) -

Intelligence pertaining to identification, strength, command structure, and disposition of the personnel, units, and equipment of any foreign military force. [DCI]

Organic Sensor Data -

Data from owned (i.e., friendly or "blue") sources detecting events/entities.

Parameter -

A variable whose value for an object under consideration determines some characteristic of the object within a range of possibilities, e.g. "length".

Photographic Intelligence (PHOTINT)

The collected products of photographic interpretation classified and evaluated for intelligence use; it is a category of *imagery intelligence*. [DIC]

Predicate Calculus -

1. A formal language in which it is possible to express statements about simple domains.

2. A branch of symbolic logic that uses symbols for quantifies and for subjects and predicates of propositions and logical operators. (AI)

Primitive -

A fundamental building block of a discipline. The kernel of an algebra. (AI)

Production -

(1) The conversion of raw materials into products and/or components thereof, through a series of manufacturing processes. It includes functions of production engineering, controlling, quality assurance, and the determination of resources requirements. (2) The preparations of reports based on analysis of information to meet the needs of intelligence users (consumers) within and outside the Intelligence Community. [JCS]

Production Rules -

A procedural representation of knowledge having an if-then-or condition action form. (AI)

Propositional Calculus -

1. The formal mathematical/logical deduction equations associated with manipulating propositions.

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2. A branch of symbolic logic that represents propositions and operations on propositions symbolically. (AI)

Radar Intelligence (RADINT) -

Intelligence information derived from data collected by radar. [JCS]

Reconnaissance (RECCE or RECON) -

A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy; or to secure data concerning the meteorological, hydrographic or geographic characteristics of a particular area. [JCS]

Rule -

A pair, composed of an antecedent condition and a consequent proposition, which can support deductive processes. (AI)

Rules of Engagement (ROE) -

Directives issued by competent military authority which delineate the circumstances and limitations under which United States forces will initiate and/or continue combat engagement with other forces encountered. [JCS]

Sanitization -

The process of editing or otherwise altering intelligence materials, information, reports, or other products to conceal and protect sensitive intelligence sources, methods, capabilities, analytical procedures, or privileged information in order to permit wider dissemination. [DCI]

Scientific and Technical (S&T) Intelligence -

Intelligence concerning foreign developments in basic and applied scientific and technical research and development including engineering and production techniques, new technology, and weapon systems and their capabilities and characteristics; it also includes intelligence which requires scientific or technical expertise on the part of the analyst, such as medicine, physical health studies, and behavioral analyses. [DCI]

Sensitive Compartmented Information (SCI) -

All information and material bearing special community controls indicating restricted handling within present and future community intelligence collection programs and their end products for which community systems of compartmentation have been or will be formally

established. (These controls are over and above the provisions of DoD 5200.1-R, Information Security Program Regulation.) [JCS]

Sensor -

(1) An equipment which detects, and may indicate, and/or record objects and activities by means of energy or particles emitted, reflected, or modified by objects. [JCS] (2) A technical device designed to detect and respond to one or more particular stimuli and that may record and/or transmit a resultant impulse for interpretation or measurement; often called a technical sensor. The term *special sensor* is used as a matter of convenience to refer to a highly classified or controlled technical sensor.

[DCI]

Signals Intelligence (SIGINT) -

A category of intelligence information comprising either individually or in combination all communications intelligence, electronics intelligence, and foreign instrumentation signals intelligence. [JCS]

Similar Source Integration (SSI)-

The integration of data from similar classes of sensors (2D radar to 3D radar: hull mounted sonar to towed array sonar).

Situation Abstraction-

The construction of a generalized or specialized representation of a situation from all available (yet perhaps incomplete) data.

Situation Assessment-

(also see related *Tactical Picture* and *Threat Evaluation*)

The process of interpreting and expressing the environment based on Situation Abstraction products and information from technical and doctrinal data bases. The Situation Assessment produces estimates of the situation elements, those information items which in the aggregate form the assessment; this process generally reveals constituency/dependency relations among the elements, and the behavioral activities of the objects within the scope of the estimate.

Enemy Situation -

That intelligence required by a commander concerning the enemy, including: unit identifications, unit dispositions, boundaries, locations of weapons of all kinds, mine fields, roadblocks, entrenchments, obstacles,

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defensive installations, logistics, command facilities, activities, personnel and weapon strengths, morale and combat efficiency, and reserves.

Source -

(1) A person, thing, or activity from which intelligence information is obtained. (2) In clandestine activities, a person (agent), normally a foreign national, in the employ of an intelligence activity for intelligence purposes. (3) In interrogation activities, any person who furnishes intelligence information, either with or without the knowledge that the information is being used for intelligence purposes. In this context, a controlled source is in the employment or under the control of the intelligence activity and knows that the information is to be used for intelligence purposes. An uncontrolled source is a voluntary contributor of information and may or may not know that the information is to be used for intelligence purposes. [JCS]

Surveillance -

The systematic observation of aerospace, surface, or subsurface areas, places, persons, or things by visual, electronic, photographic, or other means. [JCS]

Tactical Picture -

The combination of locational, referential and narrative data into an understanding of the operational environment.

Target -

(1) A geographical area, complex, or installation planned for capture or destruction by military forces. (2) In intelligence usage, a country, area, installation, agency, or person against which intelligence operations are directed. (3) An area designated and numbered for future firing. [JCS]

Target Acquisition -

The detection, identification, and location of a target in sufficient detail to permit the effective employment of weapons. [JCS]

Telemetry Intelligence (TELINT) -

Technical information and intelligence information derived from the intercept, processing, and analysis of foreign telemetry. Telemetry intelligence is a category of foreign instrumentation signals intelligence. [JCS]

Template -

A template is a model, in space and time, of the patterns of dispositions, movements, and activities which characterize the coordinated and ordered behavior in the field of military formations, units and subunits as each carries out its assigned role in a military or combat operation; intelligence staffs make use of doctrinal and event templates, adjusted to local terrain, to analyze and predict enemy courses of action.

Statistical Template -

A template which includes measures of uncertainty or confidence involving the template parameters.

Templating -

A process of developing a set of structural, organizational, time, and distance relationships which together characterize an event, activity, or entity of interest.

Threat Assessment -

A multi-perspective process of interpreting estimates of lethality and risk in terms of the ability of own force to engage the enemy effectively, and indications and warning of enemy intentions by coupling products of Situation Assessment with the information provided by a variety of technical and doctrinal data bases.

Threat Evaluation -

A multi-perspective (red, white, blue) process of developing estimates of danger, lethality, intent, and risk associated with a set of red and white observables.

Track -

(1) A series of related contacts displayed on a plotting board. (2) To display or record the successive positions of a moving object. (3) To lock onto a point of radiation and obtain guidance therefrom. (4) To keep a gun properly aimed, or to point continuously a target-locating instrument at a moving target. (5) The actual path of an aircraft above, or a ship on, the surface of the earth. The course is the path that is planned; the track is the path that is actually taken. [JCS]

Composite Track File -

That track file resulting from the application of a tracking process to an appropriate sensor data or to sensor-specific tracks.

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Firm Track -

1. An established track.
2. A new (tentative) track becomes a firm track when sufficient update information or other entries are made to raise the confidence level such that the track is considered real or valid. At the instant a track becomes fire, it is eligible for transmission on the Data Link.

Pretrack -

A complete list (according to some association hypothesis) of the detections/measurements to be associated with a particular target. This target may or may not have a state estimate or be otherwise identified.

Priority Track -

A measure of the urgency of action required on a particular track. The computer orders tracks by priority for the consideration of console operators.

Track Categorization -

The categorization of a track into one of a pre-defined set of meaningful class or division of tracks.

Track Classification -

(Same as *Track Categorization*)

Track Filtering -

A computational process by which "best" estimates of the states of an entity are derived from measurements.

Track History -

A series of points representing the most recent position updates of a track which may be displayed on a display console at operator request. This aids the console operator in following the path of a maneuvering track.

Track Initiation -

The process of establishing a new track in the system.

Track Locator -

A reference number used to catalog within the system data base the aggregate of common information maintained on a specific track.

Trackers -

Algorithms used to record and compute the successive position of an entity(s) of interest (see correlator/tracker).

Tracking -

(1) Precise and continuous position-finding of targets by radar, optical, or other means. [JCS] (2) The computational process dealing with the estimation of an object's true position

based on noisy observations (measurements) of it. Tracking may consist of filtering (estimating the position at the time of the latest observation), smoothing (estimating the position at a point in the past), and prediction (estimating the position at a point in the future).

Vulnerability -

(1) The susceptibility of a nation or military force to any action by any means through which its war potential or combat effectiveness may be reduced or its will to fight diminished. (2) The characteristics of a system which cause it to suffer a definite degradation (incapability to perform the designated mission) as a result of having been subjected to a certain level of effects in an unnatural (manmade) hostile environment. [JCS]